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NOTICE OF ALLOWANCE AND FEE(S) DUE

7590

05/06/2004

Paul D. Greeley, Esq.
Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
10th Floor
One Landmark Square
Stamford, CT 06901-2682

EXAMINER

LYONS, MICHAEL A

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 05/06/2004

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/059,703	01/29/2002	Jens Cierullies	US 20 01 0487	5952

TITLE OF INVENTION: DETERMINATION OF PROPERTIES OF AN OPTICAL DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1330	\$300	\$1630	08/06/2004

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

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B. If the status is changed, pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above and notify the United States Patent and Trademark Office of the change in status, or

If the SMALL ENTITY is shown as NO:

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B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.

☐ Applicant claims SMALL ENTITY status.
See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail

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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

7590

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Paul D. Greeley, Esq.
 Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
 10th Floor
 One Landmark Square
 Stamford, CT 06901-2682

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

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EXAMINER	ART UNIT	CLASS-SUBCLASS
LYONS, MICHAEL A	2877	356-477000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent); ☐ individual ☐ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

- ☐ Issue Fee
- ☐ Publication Fee
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

- ☐ A check in the amount of the fee(s) is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

Director for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature)

(Date)

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Alexandria, Virginia 22313-1450.

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EXAMINER

LYONS, MICHAEL A

ART UNIT

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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 89 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 89 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (703) 305-1383. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

Notice of Allowability

Application No.

10/059,703

Examiner

Michael A. Lyons

Applicant(s)

CIERULLIES ET AL.

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment filed 02 February 2004.
2. ☒ The allowed claim(s) is/are 1-36.
3. ☒ The drawings filed on 02 February 2004 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

EXAMINER'S AMENDMENT AND STATEMENT OF REASONS FOR ALLOWANCE

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Paul Greeley on April 29, 2004.

The application has been amended as follows:

Claims 29 and 30 have been amended as follows:

Claim 29: A method of determining a property of an optical device under test, comprising:

detecting a change of a signal with time, the detected signal being the basis for deriving the property; and

filtering the detected signal by:

transforming the detected signal to get a Fourier transformed signal;

filtering the Fourier transformed signal with a filter to obtain a filtered Fourier transformed signal;

retransforming the filtered Fourier transformed signal to obtain a filtered signal; [and]

deriving the property on the basis of the filtered signal; and

correcting the detected signal for a non-linearity to obtain a corrected first signal.

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Claim 30: The method of claim 29, [further comprising] wherein that step of correcting the detected signal for a non-linearity to obtain a corrected first signal [by] comprises:

using a first initial coherent light beam;
changing a first initial property of the first initial coherent light beam;
coupling the first initial coherent light beam to the device under test;
detecting a first signal of the first initial coherent light beam received from the device under test; and
correcting a non-linearity in the first signal caused by a non-linearity in the change of the first initial property by interpolating the first signal on a linear scale.

Additionally, claim 41 has been cancelled.

Allowable Subject Matter

Claims 1-36 are allowed in view of the prior art.

The following is an examiner's statement of reasons for allowance:

As to claims 1, 29, and 36, the prior art of record, taken either alone or in combination, fails to disclose or render obvious a method and a software program for executing the method of determining a property of an optical device under test, in combination with the rest of the limitations of the above claims.

With regard to claim 1 and 36, the prior art, such as US Pat. 6,606,158 to Rosenfeldt discloses a method of determining a property of an optical device under test. However, this prior art fails to disclose the correction of a non-linearity in a first signal. Non-linearities are used in the device; however, they are used as a compensation means and are not corrected for.

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With regard to claim 29, US Pat. 6,532,073 to Ge discloses a fringe analysis error detection method and fringe analysis error correction method. This method relies on the Fourier transformation of a detected signal generated by interference fringes, the filtering of said signal, and then performing an inverse Fourier transformation on the filtered transformed signal to generate a 'pure' filtered signal. This prior art, though, fails to address any non-linearities generated by the fringe signal, and a combination where a non-linearity may further be corrected would not be obvious.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Lyons whose telephone number is 571-272-2420. The examiner can normally be reached on Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2877

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MAL
April 29, 2004

A handwritten signature in black ink, appearing to read 'Samuel A. Turner', with a long horizontal flourish extending to the right.

Samuel A. Turner
Primary Examiner

and

(e) repeating ~~the last two steps (c) and (d)~~ until the ~~complete~~ total range of time ~~interval~~ is covered.

Claim 27 (Currently amending): The method of claim 4 26, further comprising ~~choosing~~ the step of selecting the predetermined first range of time by:

determining the an average period of the oscillations of the first signal; and
choosing ~~the~~ a size of the range so that more than about two average periods fit in the chosen range of time.

Claim 28 (Currently amending): The method of claim 4 12, further comprising determining the points of mean value by:

determining the maximum of the Fourier transformed signal of the first signal,
using the maximum to determine a size of a high-pass filter, and
filtering the Fourier transformed first signal with the high-pass filter.

Claim 29 (Currently amending): A method of ~~determination of~~ determining a property of an optical device under test; comprising:

detecting a change of a signal with time, the detected signal being the basis for deriving the property; ; and

filtering the detected signal by:

transforming the detected signal to get a Fourier transformed signal; ;

filtering the Fourier transformed signal with a filter to get obtain a filtered Fourier transformed signal; ;

retransforming the filtered Fourier transformed signal to get obtain a filtered signal; ; ~~and~~

deriving the property on the basis of the filtered signal; and

correcting the detected signal for a non-linearity to obtain a corrected first signal.

Claim 30 (Currently amending): The method of claim 29, ^{wherein that step of} ~~further comprising~~ correcting the detected signal for a non-linearity to get obtain a corrected first signal ~~by~~ comprises:

using a first initial coherent light beam_i;

changing a first initial property of the first initial coherent light beam_i;

coupling the first initial coherent light beam to the device under test_i;

detecting a first signal of the first initial coherent light beam received from the device under test_i; and

correcting a non-linearity in the first signal caused by a non-linearity in the change of the first initial property by interpolating the first signal on a linear scale.

Claim 31 (Currently amending): The method of claim 42 13, further comprising:

using the corrected first signal to calculate the corrected first phase signal versus frequency_i;

filtering the corrected first phase signal by Hilbert transforming it the corrected first phase signal before filtering it the corrected first phase signal to get obtain a corrected signal to be filtered by detecting a change of a signal with time, the corrected first signal being the basis for deriving the property_i; and

filtering the detected signal by transforming the detected signal to get obtain a Fourier transformed signal_i;

filtering the Fourier transformed signal with a filter to get obtain a filtered Fourier transformed signal_i;

retransforming the filtered Fourier transformed signal to get obtain a filtered signal_i; and deriving the property on the basis of the filtered signal.

Claim 32 (Currently amending): The method of claim 4 19, further comprising filtering the corrected first signal before calculating the group delay.

Claim 33 (Currently amending): The method of claim 4 32, further comprising adapting the filtering to the shape of the corrected first signal by:

intersections of the ordinate of the fraction with the curve of the spectral signal_i;
and determining the mean frequency f_{mean} as the average of the abscissas_i;
calculating the filter width according to the formula: filter width=
 $f_{\text{mean}}(\text{GD}_{\text{range}}/\text{GD}_{\text{mean}})$,
calculating the group delay_i; and
adding the subtracted gradient to the calculated group delay.

Claim 36 (Currently amending): A software program or product for
executing a method for determining a property of an optical device under test,
when run on a data processing system, ~~said the~~ the method comprising:

program instructions for using a first initial coherent light beam_i;
program instructions for changing a first initial property of the first initial
coherent light beam_i;
coupling the first initial coherent light beam to the device under test,
program instructions for detecting a first signal of the first initial coherent
light beam received from the device under test_i; and
program instructions for correcting a non-linearity in the first signal caused
by a non-linearity in ~~the~~ a change of the first initial property by interpolating the
first signal on a linear scale.

Claim 37 through 40 (Withdrawn).

~~Claim 41 (New): An apparatus for determining properties of an optical
device under test, the apparatus comprising:~~

~~a first beam splitter, said first beam splitter being in a path of a coherent
light beam, said first beam splitter for splitting said coherent light beam to a first
initial light beam traveling a first initial path and to a second initial light beam
traveling a second initial path;~~

a second beam splitter, said second beam splitter being in said first initial path, said second beam splitter for splitting said first initial light beam into a first light beam, said first light beam traveling a first path, and said second beam splitter splitting said first initial light beam into a second light beam, said second light beam traveling a second path, said first path has a predetermined place in said first path for coupling said first light beam to the optical device under test;

a third beam splitter, said third beam splitter being in said first and second path, said third beam splitter for superimposing said first and said second light beams after said second light beam has traveled a different path relative to said first light beam to produce an interference between said first light beam and said second light beam, said interference being in a resulting first superimposed light beam, said resulting first superimposed light beam traveling a first resulting path;

a first power detector, said first power detector for continuously detecting as a first signal a power of said first superimposed light beam as a function of time upon tuning a frequency of said coherent light beam from a minimum frequency to a maximum frequency of a predetermined frequency range in a predetermined time interval;

a fourth beam splitter, said fourth beam splitter for splitting said second initial beam in a third light beam traveling a third a path and a fourth light beam traveling a fourth path;

a fifth beam splitter being in said third and said fourth path, said fifth beam splitter for superimposing said third light beam and said fourth light beam after said third and said fourth light beam travel a predetermined second path, said predetermined second path producing a second interference between said third and said fourth light beam in a resulting second superimposed light beam, said resulting second superimposed light beam traveling a second resulting path;

a second power detector, said second power detector continuously detecting a second signal, said second signal being a power of said resulting second superimposed light beam as a function of time when tuning said frequency of said coherent light beam from said maximum frequency to said minimum frequency of said predetermined frequency range in said predetermined time interval; and

an evaluation unit, said evaluation unit deriving a plurality of optical properties of the optical device under test, said evaluation unit using said detected second signal for deriving an amount of non-linearity information about a non-linearity in a tuning gradient of said frequency when tuning said frequency of said coherent light beam from said maximum frequency to said minimum frequency of said predetermined frequency range, and for using said amount of non-linearity information for correcting an effect on said first signal, said effect being caused by said non-linearity to obtain a corrected first signal.